

Appendix D

TRAFFIC FORECASTING MODEL

Traffic Forecasting Model Development

Future growth rates in the Bear Lake area are expected to exceed the historical growth rates in the area. A large number of recreational housing units are planned around Bear Lake, including the Fish Haven area on the west shore, the Garden City area in Utah, and the east shore area. Therefore, to accurately forecast future traffic volumes in this area, a detailed traffic model was developed for the Bear Lake area (TAZs 1 – 27 in Figure 22).

MODEL PROCESS AND STRUCTURE

The traffic model follows the basic steps of the standard traffic forecasting process shown in Figure D-1. The roadway network for the model area includes US 89 and the minor roads connecting with US 89 (e.g., Bear Lake West Blvd.). TAZs were defined as areas with roughly homogenous development that load traffic onto the network at the same general location(s). TAZ boundaries typically follow local roads, natural barriers such as creeks, or property lines.

Land use data for the Bear Lake area was developed based on information from the Bear Lake County Comprehensive Plan, census data, and Bear Lake County residential development approvals. The base year (2002) and 2025 land use data is shown by TAZ and land use type in Table D-1. The remaining steps in the modeling process are discussed within the sections below.

The traffic model incorporates three different vehicle trip types:

- Trips produced within the Bear Lake area - these are internal-internal (I-I) and internal-external (I-X) trips;
- Trips produced outside of Bear Lake area destined to one of the TAZs within the Bear Lake area – these are external-internal (X-I) trips; and
- Trips with an origin and destination outside of the Bear Lake area that pass through the area via US 89 – these are external-external (X-X) trips.

MODEL CALIBRATION

The proportionate share of total traffic volume for each trip type was calibrated within a base year version of the model using existing traffic count data and land use inventory data. The first component incorporated and tested in the model were the I-I and I-X trips produced by existing housing units. Information on these trip types was available from traffic counts conducted at several of the study intersections that provide access to

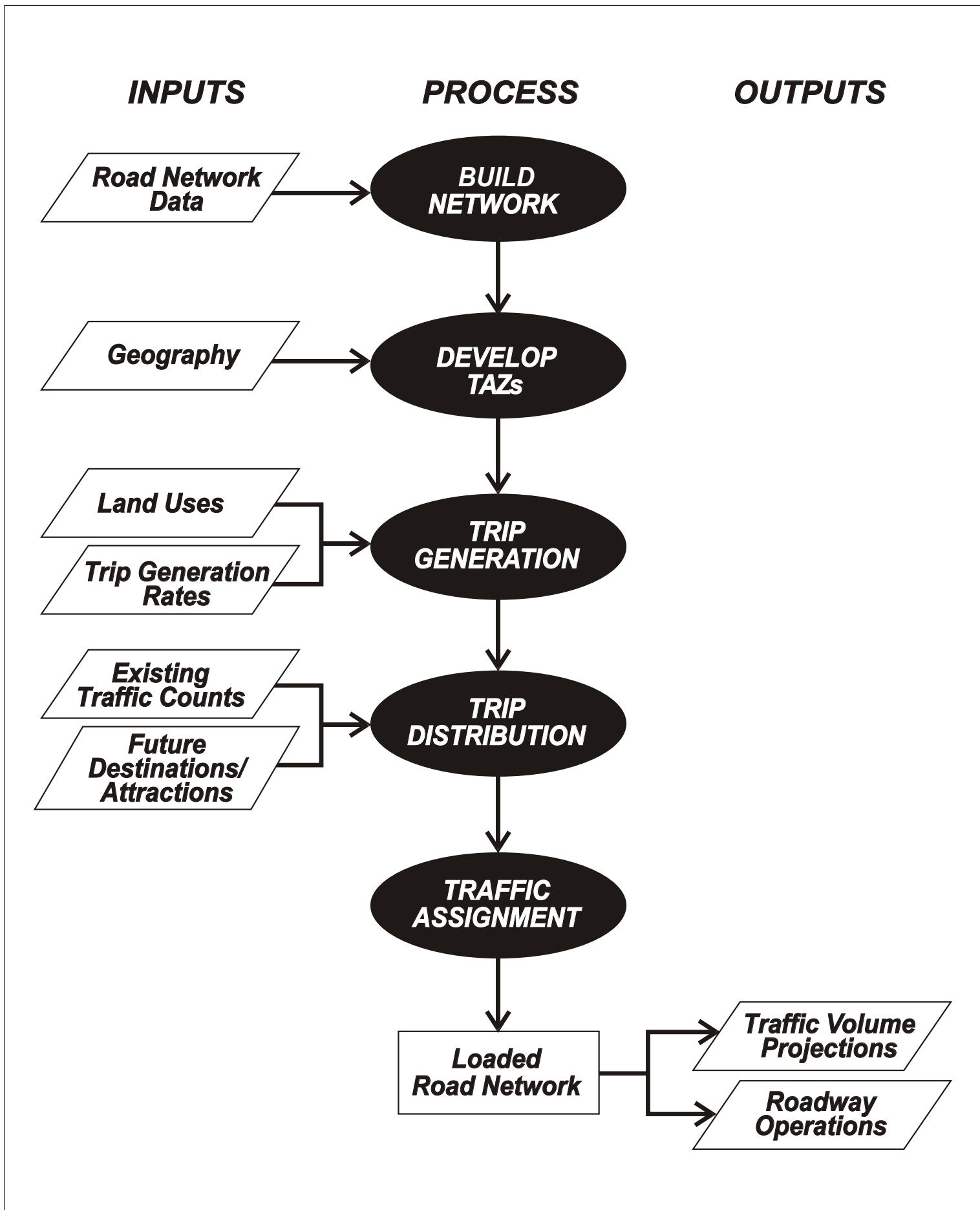


Figure D-1
TRAVEL FORECASTING PROCESS

**Table D-1
Study Area Land Use Data**

TAZ	2002			2025			Growth (2025-2002)		
	HHs	Retail Emp.	Other Emp.	HHs	Retail Emp.	Other Emp.	HHs	Retail Emp.	Other Emp.
1	128	10	5	318	20	20	190	10	15
2	11	0	0	41	0	0	30	0	0
3	50	0	0	55	0	0	5	0	0
4	24	0	0	34	0	0	10	0	0
5	46	0	0	236	0	20	190	0	20
6	20	0	0	40	20	0	20	20	0
7	19	0	0	29	0	0	10	0	0
8	44	5	5	84	5	5	40	0	0
9	58	0	0	158	20	5	100	20	5
10	15	0	0	45	0	0	30	0	0
11	65	0	0	255	40	20	190	40	20
12	2	0	0	5	0	0	3	0	0
13	7	0	0	120	0	0	113	0	0
14	8	0	0	13	0	0	5	0	0
15	5	0	0	55	0	0	50	0	0
16	0	0	0	10	0	0	10	0	0
17	12	0	0	22	0	0	10	0	0
18	7	0	0	7	0	0	0	0	0
19	5	0	0	10	0	0	5	0	0
20	10	0	0	15	0	0	5	0	0
21	106	10	5	116	20	15	10	10	10
22	22	0	0	32	0	0	10	0	0
23	11	0	0	15	0	0	4	0	0
24	4	10	0	4	25	0	0	15	0
25	1	0	0	1	0	0	0	0	0
26	6	0	0	73	25	0	67	25	0
27	110	0	0	227	0	20	117	0	20
28	111	0	0	116	5	15	5	5	15
29	279	0	0	298	30	75	19	30	75
30	0	0	0	32	0	25	32	0	25
31	0	0	0	0	0	0	0	0	0
32	1,035	0	0	1,059	80	100	24	80	100
Total	2,221	35	15	3,525	290	320	1,304	255	305

isolated residential developments. Examination of the traffic count data revealed that roughly 56% of these trips would distribute south to Utah. Approximately 10 % of the trips were found to distribute north of the Bear Lake area on US 89. The remaining (I-I) trips were destined for commercial or recreational locations within the Bear Lake area. The traffic count data and employment data were used to determine a weighted average distribution for these trips. The resulting distribution pattern for the I-I and I-X trips is listed in Table 12.

The X-I trips destined to residential development were then added to the model using the same distribution developed for the I-X trips. Following this, X-I trips destined to recreational and retail areas within the Bear Lake area were distributed to reflect the turning movements at intersections such as North Beach Rd., Minnetonka Cave Rd., and Fish Haven Canyon Rd.

The last component added to the model was the X-X trips passing through the Bear Lake area via US-89. By definition, the origin and destination of these trips are the external stations along US 89 to the south and north of the modeling area.

The result was a base year trip distribution for each TAZ in the Bear Lake area, calibrated to local intersection turning movement counts. The following section discusses how each trip type was modeled for the development of the 2025 DHV traffic forecast.

Preparation of Traffic Forecasts

INTERNAL-INTERNAL AND INTERNAL-EXTERNAL TRIPS

Trip generation for I-I and I-X trips was estimated for each TAZ based on the number of future housing units and the appropriate trip rate from the *HCM2000*.⁷⁹ The recreational home trip rate category was determined to accurately represent the planned residential development surrounding Bear Lake, as described in the Bear Haven Resort Transportation Impact Study.⁸⁰ Trip rates for the recreational home category are shown in Table D-2 below:

Table D-2
ITE Recreational Home Trip Generation Rates

Land Use	Unit Type	Day	Mid-Day Peak	PM-Peak	Daily
Recreational Home (ITE Code 260)	Dwelling Units	Weekday	0.31	0.26	3.16
		Weekend	0.36	N/A	3.07

⁷⁹ Transportation Research Board.

⁸⁰ DKS Associates, Inc., Bear Haven Resort Transportation Impact Study, (2002).

Because the study design hour (30th highest hour) corresponds to weekend mid-day hour, the weekend mid-day peak trip rate of 0.36 trips per dwelling unit was used.

These trips were distributed according to the relative attractiveness of the other TAZs, as reflected by their level of recreational and retail activity and the number of housing units. The future year trip distribution was established by adjusting the base year distribution to reflect future changes in the relative attractiveness of the TAZs. The future year employment estimates in Table D-1, as well as the locations of new recreational areas, were used to develop the weighted average trip distribution for 2025 presented in Table 12.

As can be seen in Table 12, there is shift in travel patterns from 2002 to 2025. The future development along US 89 from the Idaho-Utah state line to Minnetonka Cave Rd. will provide retail and recreational opportunities that currently exist outside of the area. Therefore, a portion of the trips generated within the Bear Lake area are expected to stay in the area. For example, shopping trips that today may be destined for Montpelier could, in the future, utilize future retail developments in St. Charles or Bear Haven, thus reducing the relative attractiveness of the Montpelier TAZ.

EXTERNAL-INTERNAL TRIPS

Trips originating outside of the Bear Lake area TAZs with destinations within the model network (X-I) consist of two components. First, trips destined to households were estimated using the same methodology described above for (I-X) trips originating from the households. Second, trips destined to retail or recreational areas were estimated based on historical traffic growth rates at the north and south ends of the corridor. Trips from the north were forecast using the same growth rate described earlier for the area north of Bear Lake (less than 1 percent per year). Trips from the south were forecast using a more recent growth rate (1995 to 2001) that captures the growth trend of traffic from Garden City and other Utah population centers (approximately 5 percent per year). As with the I-I and I-X trips, the distribution for the X-I trips was adjusted for the 2025 forecast to account for planned retail and recreational developments.

EXTERNAL-EXTERNAL TRIPS

Trips passing through the Bear Lake area on US 89 were forecast based on historical traffic growth rates. It was decided that the growth rate used for the area north of St. Charles (less than 1%) should be used for this component of the traffic stream, because it does not include traffic growth associated with the recent and planned development in the Bear Lake area. (Development-related traffic growth is already accounted for in the forecasts for the other trip types).

While the ultimate origin and destination of the X-X trips are the external stations along US 89 to the south and north of the modeling area, the future retail development located

along US 89, particularly near Fish Haven, will attract some of this through traffic as pass-by trips. The traffic count data and projections from the Bear Haven Resort Transportation Impact Study⁸¹ were used to assign a portion of these pass-by trips to the retail areas.

⁸¹ DKS Associates, Inc., Bear Haven Resort Transportation Impact Study, (2002).